the latter instance there is very considerable storage of mercury in the follicles each time it is rubbed in. Absorption of mercury from rectal suppositories appears to be insignificant.

HARRY E. ALDERSON.

TUBERCULOSIS

THE use of sunlight in the treatment of pulmonary tuberculosis has received much attention from physicians since Rollier demonstrated its therapeutic value in tuberculous bone and joint disease.

It is logical to believe that sunlight, one of the most potent agents for the stimulation of metabolism, and proved to be effective in surgical tuberculosis, also should be useful in the treatment of pulmonary lesions. What is the reason that with all the experience in light therapy obtained by clinicians during recent years that there should be no unanimity of opinion among them?

Pollock [1] believes that "a review of the literature is more or less confusing and does not greatly assist one in estimating the value of heliotherapy in pulmonary tuberculosis if one gives equal weight to the opinion of each writer."

Indeed, the opinions of the authors quoted play the whole scale from optimism to strong disapproval of the use of sunlight in pulmonic lesions, and one is reminded of the discussion that used to wage for and against the use of tuberculin in the same condition.

The reason for this diversity of opinion is not hard to find and lies in the fundamental similarity between the effect of sunlight and tuberculin upon a tuberculous focus. Sunlight is a potent agent for the stimulation of metabolism. The effect of a light bath on a tuberculous lesion is similar to that of a dose of tuberculin, that is, it causes a perifocal reaction which, when properly graded and spaced, initiates a healing process.

The effect of an overdose of sunlight resembles in many ways the effect of an overdose of tuberculin: increased temperature, increased toxemia and frequently bleeding.

It is essential, therefore, to select the patients who are to be exposed to sunlight with the greatest care. Fibrous lesions react best, while improvement is less marked in those individuals whose lesions approach the caseous or fibrocaseous type.

In other words, activity and toxemia are the warning signals in sun exposure as they are in the use of tuberculin. Sunlight is a stimulant of activity, and an overactive focus must not be further stimulated.

The careful consideration of dosage is an essential factor of success in the use of sun exposure. The author advocates a modification of the Rollier schedule, dividing the body into zones but limiting the exposure at first to two-minute intervals instead of five minutes as is usually done. The chest is not exposed until the rest of the body is pigmented, and great care is used in exposing the chest where pulmonary activity is present.

He concludes that exposure to sunlight, or to artificial rays where sunlight is not available, is a valuable therapeutic aid in the treatment of lung tuberculosis.

Patients showing activity and toxic symptoms must be carefully guarded against undue reactions, and precautions must be used against overstimulation.

Sunlight is of great value following thoracoplasty and artificial pneumothorax.

Success with this treatment, as in many other therapeutic measures, depends very largely on the proper selection of cases.

LEWIS SAYRE MACE.

1. Pollock, William C.: Heliotherapy in Pulmonary Tuberculosis, American Review of Tuberculosis, November, 1926, p. 505.

SURGERY

SKIN GRAFTING — Skin grafting has now reached a stage of scientific understanding. New terms [1] as autograft, a graft from the patient himself; isograft, a graft from an individual of the same species; and zoograft, a graft from a lower species, are now employed. Clarity as regards the source of grafts has been reached, and only the autograft [2] is recommended. Histological studies of the graft have led to the rational conduction of the technique of operation and the postoperative care.

For the first two to three days a skin graft is as a foreign body living a parasitic life.[3] Life is maintained by the lymph of the host permeating into the intercellular meshes of the graft. After twenty-four to thirty-six hours the capillaries of the host begin to penetrate into, or to anastomose with those of the graft. Only by the eighth day is circulation sufficiently complete to sustain life and growth. It is necessary, therefore, to obtain the graft as free from all extra subcutaneous tissue as possible and to avoid any trauma that will occlude the capillaries. Trimming off fat with scissors pinches and compresses the capillaries. On the other hand, sharp knife-blade dissection does not, and so is advised. A fresh razor blade, held in a hemostatic forceps, serves admirably and insures the necessary sharp cutting edge.

The postoperative care is recognized as being the other important phase of skin grafting. The close and continuous approximation of the skin graft to the grafted area is a principle that underlies all dressings. This approximation is most important, both in full thickness skin grafts and in split skin grafts, as the Ollier Thiersch type. Many forms of dressings for the split skin graft have been suggested, and all are good if complete and continuous immobilization is effected, but otherwise failure will ensue. Pressure and immobilization for the full thickness skin graft is usually accomplished by the use of a mould to fit the area, by the synthetic rubber sponge, or by a bandage. A definitely measured pressure would be better. Too much pressure may mean necrosis, and too little pressure a lack of proper nourishment. Ferris Smith [3] says "that, since the quantity of lymph is usually proportional

1. Davis, J. S.: The Nomenclature of Skin Grafting, Surg., Gynec. and Obst., 1925, XLI, 841-42.

2. Holman, E.: Protein Sensitization in Isoskingrafting, Surg., Gynec. and Obst., 1924, XXXVIII, 100-06.

3. Smith, F.: A Rational Management of Skin Grafts, Surg., Gynec. and Obst., 1926, XLII, 556-62.

to the height of the capillary pressure, any factor which will raise the capillary pressure will favor the increased flow of lymph. Further, we know that the peripheral venous pressure varies from 5 to 15 millimeters of mercury and that the arteriole pressure ranges from 40 to 50 millimeters of mercury. A pressure, then, which will compress the venules, that is more than 15 millimeters of mercury, and will partially compress the arterioles, meets our requirement. A dressing at a pressure of 30 millimeters of mercury has been very satisfactory in our experience." This pressure may be accomplished and determined by the use of a rubber [4] balloon bag and the blood pressure manometer, respectively.

Atraumatic cutting of the graft and perfect and continuous immobilization should be employed in all skin grafts. The full thickness skin grafts should in addition have a pressure of 30 millimeters. These are based upon scientific principles, and are essential to success.

JOHN HOMER WOOLSEY.

INDUSTRIAL MEDICINE

ORGANIZED medical service in industry is essentially a product of the last two decades in the field of industrial management, and it promises greater development in the future than it has had in the past. Yet there is enough evidence at hand to justify the statement that the industrial physician is playing an important part in American industry.

The functions of medical departments in industry as related in the report of the National Industrial Conference Board [1] are preventive and curative, and include:

Physical examinations of applicants for employment and of workers returning to employment after illness.

Periodic re-examination of workers in hazardous occupations.

Treatment and redressing of injuries.

Diagnosis and treatment of minor medical disturbances as well as advice on medical problems.

Sanitation of workshops and maintenance of proper working conditions.

Health education and accident prevention.

In the smaller plants treatment of injuries is often the only work done by the plant physician, especially if he devotes only part time to industrial work or only visits if called. In larger plants practically all of the activities mentioned above will be found as the work of the medical department, and each item really belongs in any well-developed medical service.

Nurses play a rather prominent part in the work of medical departments. In the larger groups they are important aids to the physician, while in the small organizations, they represent the backbone of the department.

The physical examination of applicants is coming to be a common feature of employment management and, with the understanding of the purpose involved, opposition on the part of workers is disappearing. The object of these examinations is not to exclude persons with defects, but rather to minimize sickness and accident risk by occupational selection.

A survey of 501 plants showed that over half made examinations occupying from ten to fifteen minutes and that the percentage of rejections was very small. Fewer injuries occurred in plants where examinations were made, but medical disorders were recorded in greater frequency, probably because of better medical work rather than a greater prevalence of disease.

Treatment of minor medical disorders seemed especially desirable in enabling the sick or injured worker to continue at his occupation and in preventing infections and serious types of illness. Plants should be equipped with proper facilities for diagnosis. If diagnosis reveals the necessity of prolonged treatment, the patient is generally referred to his private physician. In remote places both diagnosis and treatment are done at the plant.

Good health is an asset of the worker. The employer has a direct responsibility in seeing that this asset does not suffer impairment through adverse working conditions. Some plants also supplement this care by the use of health education and personal hygiene, which tends to better conditions outside of work.

The cost of medical service in industry has risen from an average of $4.43 per employee in 1920 to $5.14 per employee in 1924. The average annual expenditure for medical service was $1.03 for each $1000 of goods produced and $3.62 for each $1000 paid out for wages.

Medical service in industry has demonstrated its worth by protecting the worker from accident and disease, by health conservation, by adding to the productiveness of industry and by lessening the amount spent for public charity or for private relief, which in a number of cases would not come to the attention of a physician. Industrial medicine is already widespread, but its full influence on industry and the community is still to be measured.

C. O. SAPPINGTON.

ORTHOPEDICS

EMERGING from the subcutaneous stage with the discoveries of Lister, the surgery of deformities entered the period of open operation *pari passu* with other branches of surgical procedure.

Daily wrestling with the mechanical problems affecting the motor mechanisms of crippled human bodies through intervening years brought the devotees of bone and joint surgery up to 1914 with a fund of special knowledge which proved invaluable in dealing with the skeletal wreckage of war.

So great and so urgent was the need for the application of orthopedic principles in war surgery, that those already recognized as specialists in this branch of practice were altogether inadequate to meet the demand. Groups of picked men, usually chosen for a degree of proficiency in general surgery, were trained as rapidly as possible by high pressure methods of instruction in the principles of orthopedic surgery under military routine. Thus, at once, was the spur of a great need applied to the older special

4. Smith, F.: Pressure Bags for Skin Grafting, Surg., Gynec. and Obst., 1926, XLIII, 99.

1. Medical Care of Industrial Workers, National Industrial Conference Board, 1926, p. 112.